

Figure 1: Allpass Filter-Based Equalization Filter Structure

Prior Art

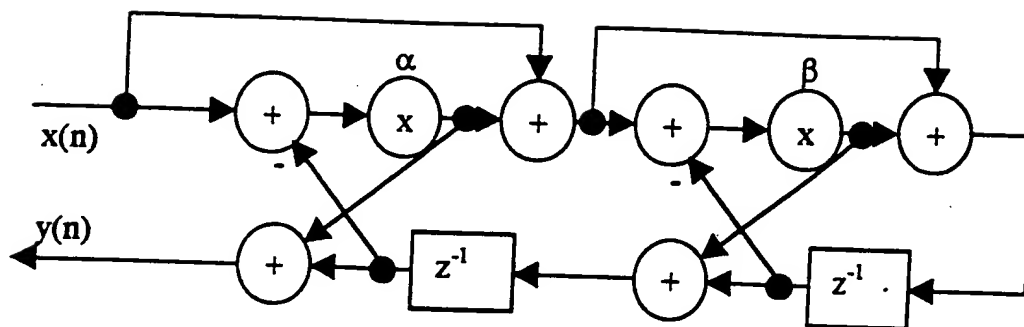


Figure 2: Second-Order Allpass Filter

Prior Art

300
↓

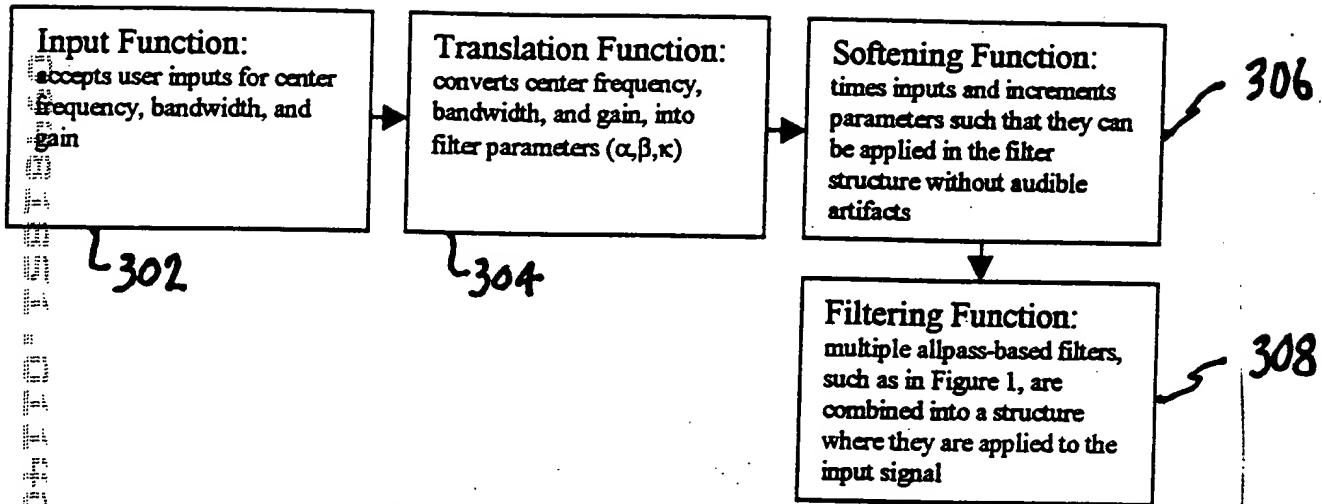


Figure 3: General Graphametric EQ Structure

Download $\tan(\pi BW/F_s)$

and $\frac{\tan(\Omega/2) - 1}{\tan(\Omega/2) + 1}$

via host device Eq(1)

402

Approximate

$$\beta = \frac{\tan(\Omega/2) - K}{\tan(\Omega/2) + K} \quad \text{Eq(2)}$$

via expression:

$$1/x \approx \frac{1}{5} \cdot 2^{-n-2} - r \cdot 2^{-2n-1} + 2^{-n-1}$$

by using $s = 0.5$ to 0.6 and
then tabulating or encoding
inverse of s

404

no

$$\tan(\pi BW/F_s) \leq 0.0625$$

yes

406

Use Eq(3)
to approximate
 β in Cut Region

Approximate β in Cut Region

$$\beta = \frac{\tan(\pi BW/F_s)}{\log_2(3) \cdot K} \quad \text{Eq(6)}$$

via expression:

$$1/x \approx \frac{1}{5} \cdot 2^{-n-2} - r \cdot 2^{-2n-1} + 2^{-n-1}$$

where inverse of $\log_2(3)$ is
tabled or encoded

Use Eq(1): or
tabled/encoded value
 $\frac{\tan(x) - 1}{\tan(x) + 1}$
to approximate
 β in Boost Region

Figure 4

500

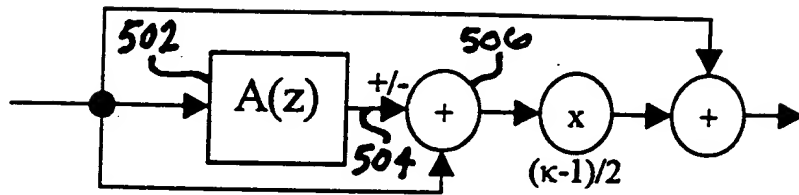


Figure 5: First-Order Shelf Filter

Prior Art